LIGN110 Section

Wednesday, 18 November 2020

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Section time: W. 3-3:50pm PST

OH time: F. 9-10am PST

Zoom: ucsd.zoom.us/my/acmai

Email: acmai at ucsd

Knowledge Check

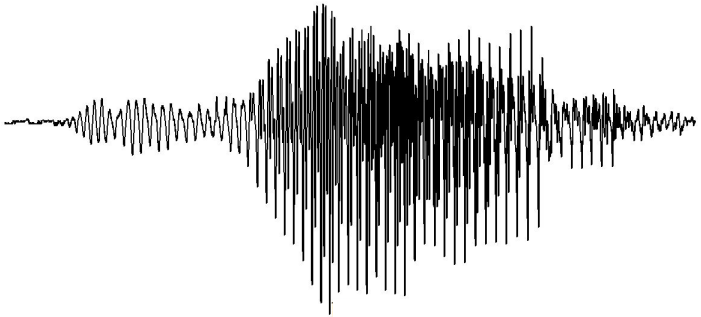
Which image is a spectrum?
Which is a waveform?
Which is a spectrogram?

How should each of the image axes be labeled?

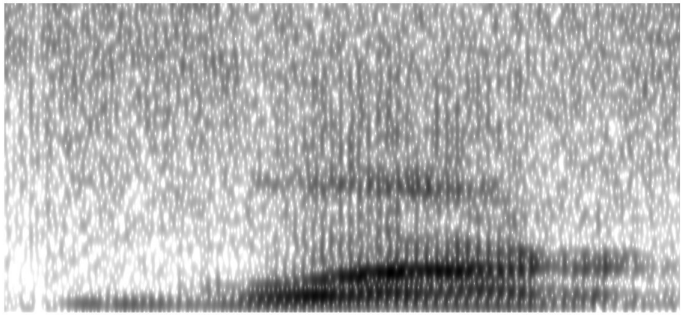
Can you determine time information from a spectrum?

Can you determine frequency information from a waveform?

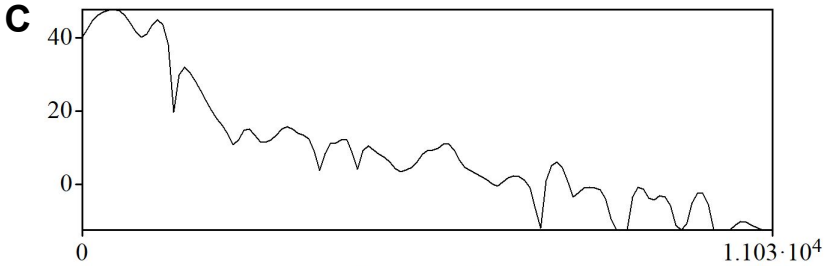
A



B



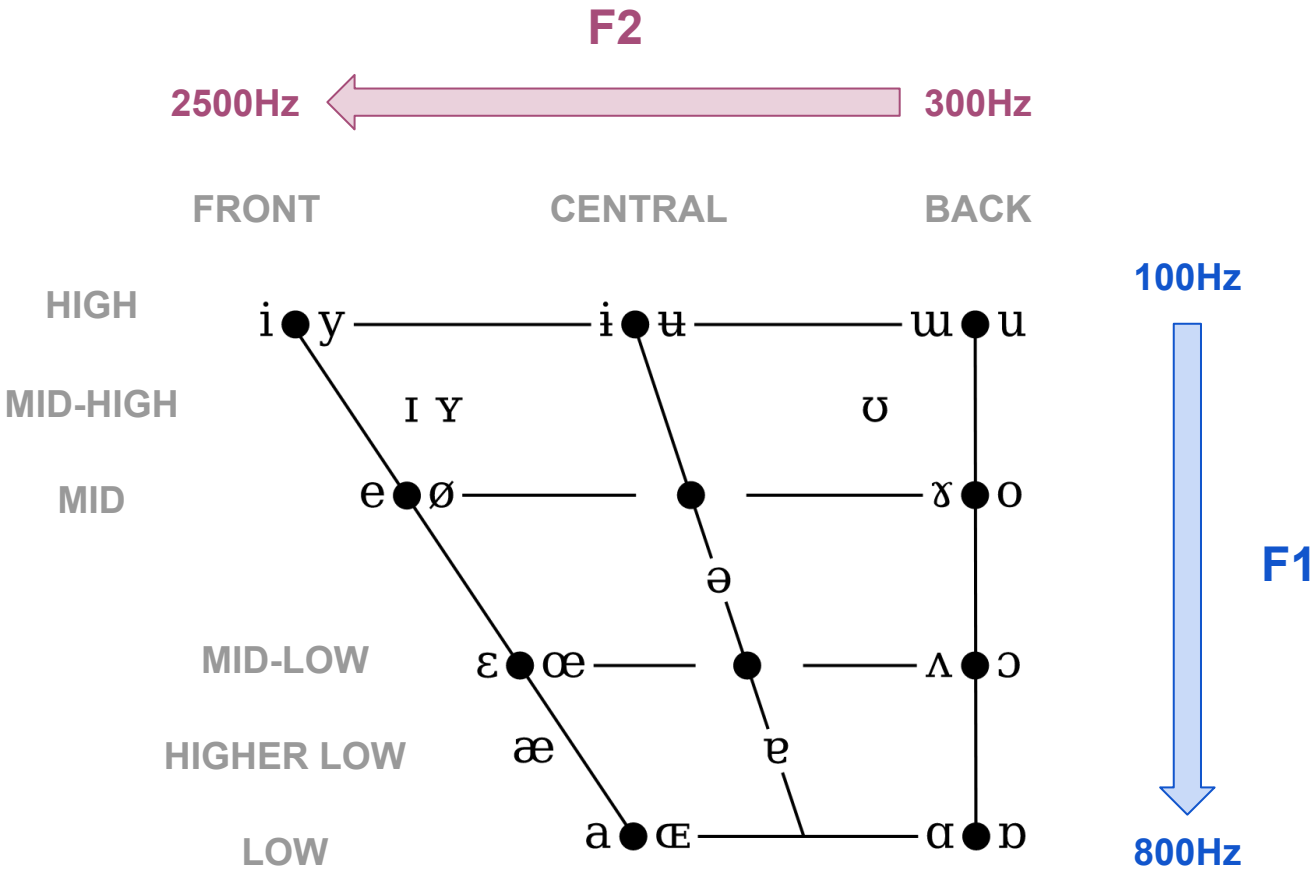
C



Conceptual Questions

Is there a difference between harmonics and formants, and if so, what is it?

What’s the difference between Fourier synthesis and Fourier analysis?


F2
2500Hz
300Hz
FRONT
CENTRAL
BACK
HIGH
MID-HIGH
MID
MID-LOW
HIGHER LOW
LOW
i y
ɪ ʏ
e ø
ɛ œ
æ
a ɶ
ɨ ʉ
ə
ɐ
ɯ u
ʊ
ɤ o
ʌ ɔ
ɑ ɒ
100Hz
F1
800Hz

Vowel Acoustics

The **lower** the vowel, the **higher** the **F1**.

The **fronter** the vowel, the **higher** the **F2**.

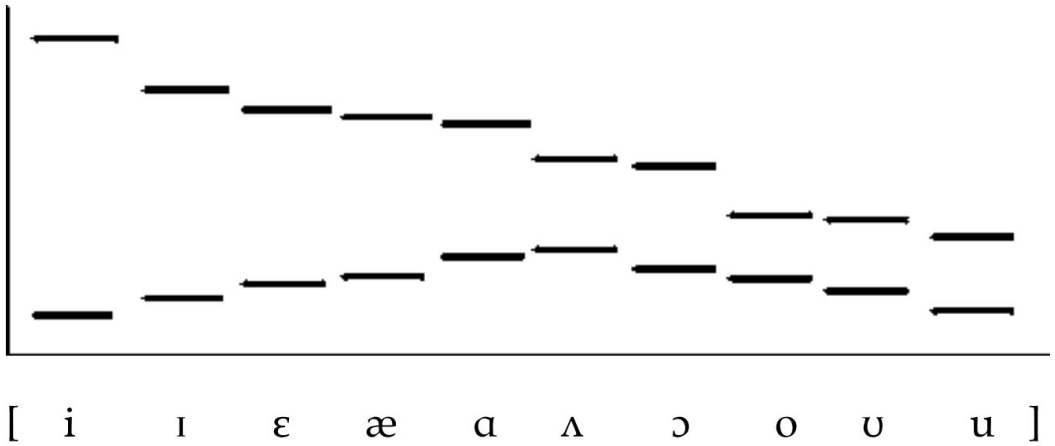


Figure 8.4 The pattern of the first two formants for the simple vowels of English

Vowel Acoustics

The **lower** the vowel, the **higher** the **F1**.

The **fronter** the vowel, the **higher** the **F2**.

Comparing [i] with [u]:

Is the F1 of [i] higher or lower than [u]?

Is the F2 of [i] higher or lower that [u]?

Why?

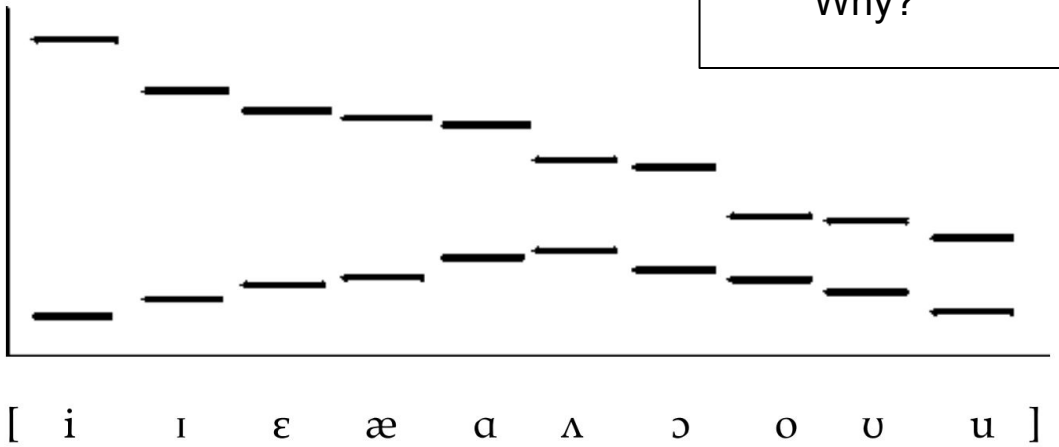


Figure 8.4 The pattern of the first two formants for the simple vowels of English

Vowel Acoustics

The **lower** the vowel, the **higher** the **F1**.

The **fronter** the vowel, the **higher** the **F2**.

Comparing [i] with [æ]:

Is the F1 of [i] higher or lower than [æ]?

Is the F2 of [i] higher or lower that [æ]?

Why?

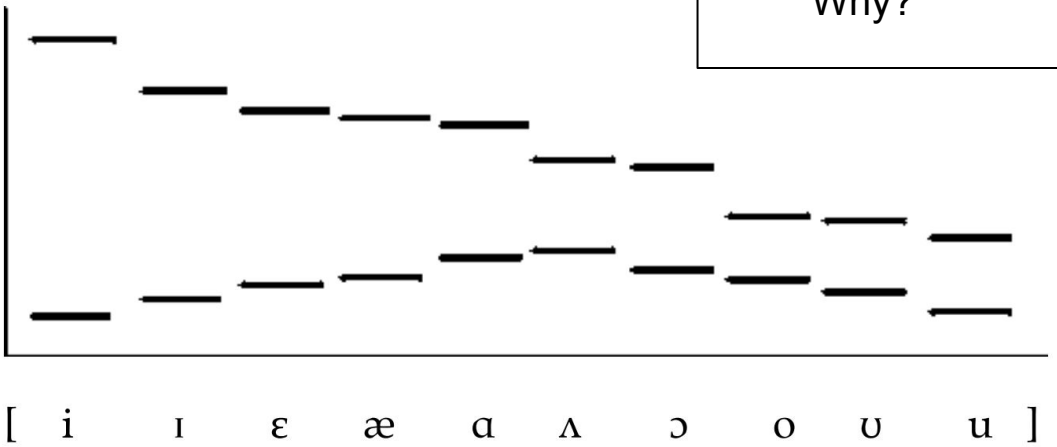


Figure 8.4 The pattern of the first two formants for the simple vowels of English

1 Determine the frequency of the sine waves in Figure 7.16.

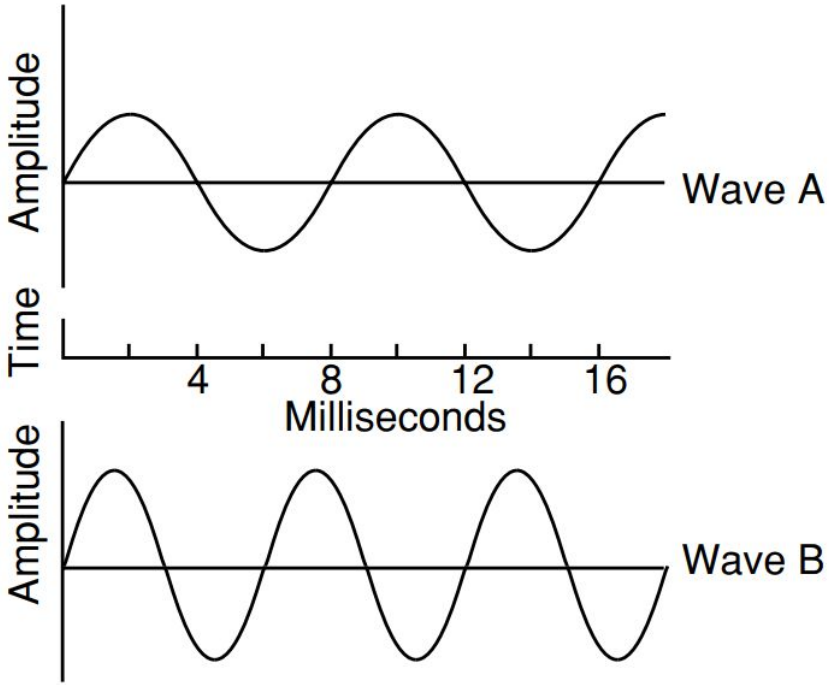


Figure 7.16

Exercise

If the fundamental frequency of violin note is 440Hz, what is the value of its fifth harmonic?

a. 88 Hz
b. 440 Hz
c. 500 Hz
d. 2200 Hz

3 On the spectrogram in Figure 7.18,

a. Point out the 1st, 4th, and 10th harmonics.

b. Using the 10th harmonic, determine the fundamental frequency at the time indicated by the arrow.

c. What pitch changes would we hear during the course of the entire sound?

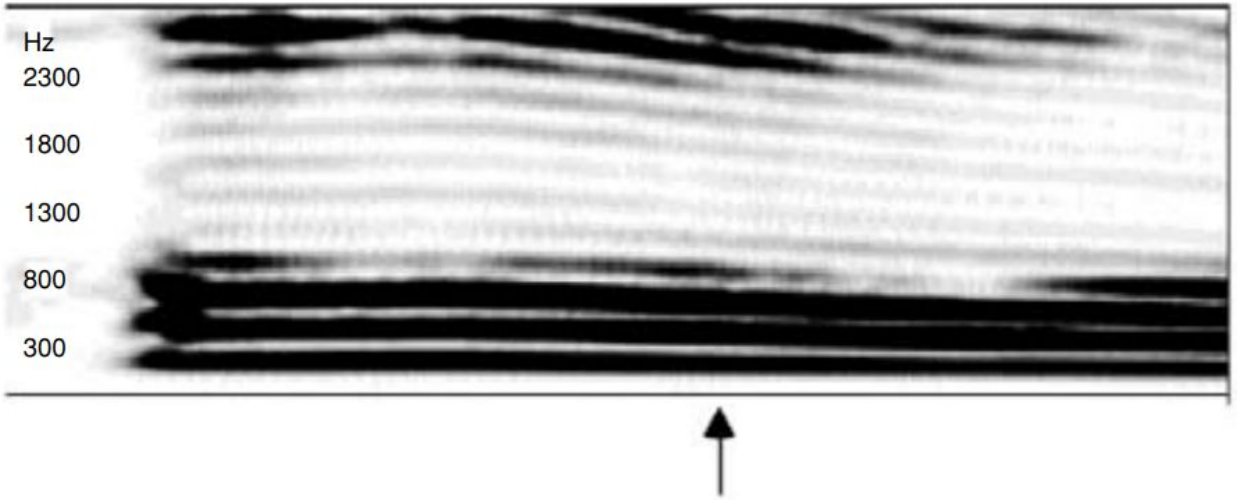


Figure 7.18

Exercise

If you produce a vowel [u] and want to make the frequency of F2 higher, how should you move your articulators?

a. move your tongue forwards
b. move your tongue backwards
c. close your jaw more
d. open your jaw more

Exercise

A complex waveform is composed of sine waves of 100Hz, 200Hz, and 250Hz. What is the fundamental frequency of this complex waveform?

a. 100Hz
b. 200Hz
c. 250Hz
d. 550Hz

Exercise

If you produce a vowel [u] and increase the fundamental frequency, which of the following will most likely happen?

a. The vowel will become a [i] vowel
b. The perceived pitch of the vowel increases
c. The perceived loudness of the vowel increases
d. The perceived duration of the vowel increases
e. The first formant will lower